From Individual Lymph Nodes to Stations and Zones

East and West Reconciled?

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When there are no distant metastases prognosis of a bronchogenic carcinoma depends on specific lymph node involvement, patients with preoperatively identified mediastinal nodal metastases having a poor prognosis. In this way, characterization of individual lymph nodes and their grouping is of paramount importance. Unfortunately, until now no lymph node map has been available that is universally accepted and agreed upon. Most commonly used are the Naruke map advocated by the Japan Lung Cancer Society and the so-called Mountain-Dresler modification of the American Thoracic Society map which was adopted by the Union Internationale Contre le Cancer and depicted in the American Joint Commission on Cancer staging manual.[1,2] The Naruke map especially relies on precise surgical landmarks and the American Thoracic Society map more on radiologic reference points. However, important differences exist between these two nodal charts rendering nodal mapping the Achilles heel of the current tumor node metastasis classification.[3] In preparation for the 7th tumor node metastasis classification due in May 2009, the International Association for the Study of Lung Cancer initiated the Lung Cancer Staging Project and proposals for the revision of the N descriptors were published in July 2007.[4] In this article the new concept of anatomic lymph node "zones" is introduced. Six zones are defined: regarding N1 nodes, a peripheral and hilar zone, and for N2 nodes, an upper and lower mediastinal, aortopulmonary, and subcarinal zone. However, a definite chart was not yet proposed and this was the subject of a subsequent manuscript which is now published.[5]

Why are the lymph nodes in lung cancer so difficult to assess and characterize? For a long time the discussion has centered around the anatomic borders of the mediastinal lymph node stations and the demarcation between N1 and N2 involvement, but much less on the hilar and intrapulmonary lymph nodes. This was already recognized during the International Workshop on Intrathoracic Staging held in London in October 1996.[6] Over the last year, highly dedicated and renowned thoracic surgeons from different continents have gathered to create a new international nodal map.[5] They are to be commended for reconciling the "best of both worlds," not only uniting East and West, but also surgical and radiologic landmarks. Specific definitions are provided for each lymph node station which are now grouped into seven "zones," the supraclavicular being added to the six previously described. Detailed radiologic images are added clearly defining the border of each station. Although at first sight changes seem to be minimal, this new map will have profound implications for all physicians dealing with lung cancer, not in the least for thoracic surgeons.

In the new proposal the pleural reflection which is not visible to thoracic radiologists, is no longer considered to represent the border between N1 and N2 disease. Specific radiologic and surgical landmarks now delineate each lymph node station. However, some of these margins are more difficult to identify for a thoracic surgeon; e.g., the lower border of #2R and the upper border of #4R consist of the intersection of the caudal margin of the innominate vein with the trachea, which is difficult to visualize during a classic cervical

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mediastinoscopy. The lower border of #4R and the upper border of #10R defined by the lower rim of the azygos vein, is less difficult to identify. Moreover, this means that during mediastinoscopy N1 nodes can be easily reached as the lower border of N2 involvement has shifted upward at this level. However, the subcarinal zone #7 has become larger and has extended caudally and laterally, implying that the region of N2 involvement has increased at this level. It now extends to the lower border of the bronchus intermedius on the right, and the upper border of the lower lobe bronchus on the left. Station #3 remains very particular as it is the only one that is divided into two distinct compartments without any direct anatomic connection between the prevascular and retrotracheal parts. Station #1 also deserves attention grouping the low cervical, sternal notch, and also supraclavicular nodes, in this way including the border between N2 and N3 disease.

As has been recognized by Japanese surgeons for a long time, the midline of the trachea in fact lies at its left lateral wall which is adopted in the current proposal. This implies that a positive pretracheal #4R lymph node as demonstrated in Figure 4b of Ref. 5, is considered to be N2 involvement for a right-sided lung cancer, but N3 disease for a left-sided one.

The grouping of the different stations into specific "zones" is very logical and will allow for a more reliable comparison between studies evaluating the impact of nodal disease on staging, restaging, treatment, and prognosis of the different N categories.

The need for a universally adopted lymph node map was felt for a very long time. The newly proposed chart provides a common language for all physicians dealing with lung cancer, not only for the different specialties but also for all continents of our globe. Although representing a compromise with some imperfections, this new lymph node map will hopefully be accepted worldwide in a very near future. Subsequent prospective studies will enable a better distinction between prognostically different N categories, allowing specific tailoring of diagnostic and treatment strategies. There is still a long way to go but from now on, let us take the same road and use the same map!

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